

IN THE CLAIMS:

1-433 (canceled)

434. (previously presented) Nanoparticle-oligonucleotide conjugates which are nanoparticles having oligonucleotides attached to them, the oligonucleotides having a covalently bound polythiol functional group that can bind to the nanoparticles.

435. (canceled)

436. (previously presented) Nanoparticle-oligonucleotide conjugates which are nanoparticles having oligonucleotides attached to them, the oligonucleotides having a covalently bound polythiol functional group that can bind to the nanoparticles, at least some of the oligonucleotides having a sequence complementary to at least one portion of the sequence of a nucleic acid or another oligonucleotide.

437. (currently amended) The conjugates of claims ~~435 or 436~~ wherein the oligonucleotides are further present at a surface density sufficient so that the conjugates are stable.

438. (previously presented) The conjugates of claim 437 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of at least 10 picomoles/cm²

439. (previously presented) The conjugates of claim 438 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of at least 15 picomoles/cm².

440. (previously presented) The conjugates of claim 439 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of from about 15 picomoles/cm² to about 40 picomoles/cm².

441. (currently amended) The conjugates of claims ~~435 or 436~~ wherein the nanoparticles are metal nanoparticles or semiconductor nanoparticles.

442. (previously presented) The conjugates of claim 441 wherein the nanoparticles are gold nanoparticles.

443. (currently amended) The conjugates of claims ~~435 or 436~~ wherein the oligonucleotides comprise at least one type of recognition oligonucleotides, the recognition portion having a sequence complementary to at least one portion of the sequence of a nucleic acid or another oligonucleotide.

444. (previously presented) The conjugates of claim 443 wherein each of the recognition oligonucleotides comprising a spacer portion and a recognition portion, the spacer portion being designed so that it is bound to the nanoparticles,

445. (previously presented) The conjugates of claim 444 wherein the spacer portion has a moiety covalently bound to it, the moiety comprising a cyclic disulfide functional group through which the spacer portion is bound to the nanoparticles.

446. (previously presented) The conjugates of claim 444 wherein the spacer portion has a moiety covalently bound to it, the moiety comprising a polythiol functional group through which the spacer portion is bound to the nanoparticles.

447. (previously presented) The conjugates of claim 442 wherein the spacer portion comprises at least about 10 nucleotides.

448. (previously presented) The conjugates of claim 447 wherein the spacer portion comprises from about 10 to about 30 nucleotides.

449. (previously presented) The conjugates of claim 448 wherein the bases of the nucleotides of the spacer portion are all adenines, all thymines, all cytosines, all uracils or all guanines.

450. (currently amended) The conjugates of claims ~~435 or 436~~ further a type of diluent oligonucleotides.

451. (previously presented) The nanoparticles of claim 450 wherein the diluent oligonucleotides contain about the same number of nucleotides as are contained in the spacer portions of the recognition oligonucleotides.

452. (previously presented) The nanoparticles of claim 451 wherein the sequence of the diluent oligonucleotides is the same as that of the spacer portions of the recognition oligonucleotides.

453. (canceled)

454. (previously presented) A method of binding oligonucleotides to nanoparticles to produce nanoparticle-oligonucleotide conjugates, the method comprising:

providing oligonucleotides having covalently bound polythiol function groups that can bind to nanoparticles; and

contacting the oligonucleotides and the nanoparticles under conditions effective to allow at least some of the oligonucleotides to bind to the nanoparticles to produce the nanoparticle-oligonucleotide conjugates.

455. (currently amended) The method of claims ~~454 or 455~~ wherein the nanoparticles are metal nanoparticles or semiconductor nanoparticles.

456. (previously presented) The method of claim 455 wherein the nanoparticles are gold nanoparticles.

457. (currently amended) The method of claims ~~453 or 454~~ wherein, the oligonucleotides comprising at least one type of recognition oligonucleotides, each of the recognition oligonucleotides comprising a spacer portion and a recognition portion, the spacer portion having a moiety covalently bound thereto, the moiety comprising a functional group which can bind to the nanoparticles.

458. (previously presented) The method of claim 457 wherein the spacer portion comprises at least about 10 nucleotides.

459. (previously presented) The method of claims 458 wherein the spacer portion comprises from about 10 to about 30 nucleotides.

460. (previously presented) The method of claims 459 wherein the bases of the nucleotides of the spacer are all adenines, all thymines, all cytosines, all uracils, or all guanines.

461. (previously presented) The method of claim 457, wherein the oligonucleotides further comprising a type of diluent oligonucleotides and contacting the oligonucleotides with the nanoparticles under conditions effective to allow at least some of each of the types of oligonucleotides to bind to the nanoparticles to produce the nanoparticle-oligonucleotide conjugates.

462. (previously presented) The method of claim 461 wherein the diluent oligonucleotides contain about the same number of nucleotides as are contained in the spacer portions of the recognition oligonucleotides.

463. (previously presented) The method of claim 462 wherein the sequence of the diluent oligonucleotides is the same as the sequence of the spacer portions of the recognition oligonucleotides.

464. (previously presented) The method of claim 457 wherein the oligonucleotides comprise at least two types of recognition oligonucleotides.

465-484 (canceled)

485. (previously presented) Oligonucleotides having a covalently bound polythiol functional group that can bind to the nanoparticles.

486. (canceled)